

4.—A new pedunculate barnacle, *Paralepas georgei* sp. nov. (Crustacea: Cirripedia-Thoracica) epizoic on Australian spiny lobsters and crabs

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Abstract

Paralepas georgei, a new species collected in 40-80 fathoms off the southern and lower west coast of Australia, is described and discussed. Distinctive features include scuta and a carinal keel, and a distinct pectination of the mandible.

Introduction

During a visit to the Western Australian Museum, Perth, in 1962, opportunity availed for examining a small collection of Cirripedes, epizoic on crustaceans, which was taken for detailed study. This material included a new species of the genus *Paralepas* epizoic on lobsters and crabs.

SUBORDER LEPADOMORPHA, Pilsbry 1916.
Family Heteralepadidae Nilsson-Cantell, 1921.
Genus *Paralepas*, Pilsbry, 1907.

Paralepas georgei sp. nov. (Figs.1-10)

Material examined: Holotype: WAM 190-62 taken from *Panulirus cygnus* George off Rottneest I., Western Australia (32°00'S, 115°30'E) fishing boat Gloria, 3.II.62.

Paratypes: Three specimens WAM 226-68 taken from *P. cygnus* off Rottneest I. (32°00'S, 115°30'E) fishing boat Gloria, 3.II.62.

Ten specimens WAM 191-62 (5 specimens) and ZSI C₂¹ (5 specimens) taken from *Jasus novaehollandiae* Holthuis, Swan I., Tasmania (40°44'S, 148°06'E) M. Olsen, 10.VIII.62.

Two specimens WAM 193-62 taken from *Pseudocarcinus gigas* (Lamarck) off Doubtful I. Bay, Western Australia (34°22'S, 119°36'E) 1.XI.59, 40-60 metres.

Twenty-one specimens WAM 196-62 taken from *Hypothalassia armata* (de Haan) 16 km. west of Rottneest I. (32°00'S, 115°30'E) K. Sheard, 22.IV.54, approx. 80 m.

Distribution: The above records indicate that this species of pedunculate barnacle lives in moderately deep shelf waters on the southern and lower western coasts of Australia. It is also possible that the "Lepas" mentioned by Rathbun (1923:104) on *Pseudocarcinus gigas* from Bass Strait and in the Great Australian Bight, 80-450 fathoms, also belong to *Paralepas georgei*.

Diagnosis: Capitulum swollen, cuticle strongly thickened, orifice crenulated, with distinct elongated scuta and carinal keel. Labrum bullate, crest hairless supporting sharp teeth, mandible with four teeth, lower and upper margins of all

four teeth (excepting upper margin of first) supporting several strong spines; first maxilla with cutting edge deeply notched, the smaller portion above notch armed with one strong spine followed by two smaller pectinated spines and the lower free margin with two large pectinated spines interspersed with paired thin spines; second maxilla elongated, superior margin with group of long setae and inferior margin with short setae. Cirri short, slightly curved with long pedicels. Each segment of cirri ii-vi with lesser curvature bearing semicircle of long and slender spines below the articulation and greater curvature bearing a semicircle of stout claw-like spines at articulation. Lesser curvature of each segment of cirri iv-vi with a pair of spinules in addition to semicircular whorl of spines. Single large filamentary appendage present at base of first cirrus. Penis distinctly annulated with minute rivet-like structures.

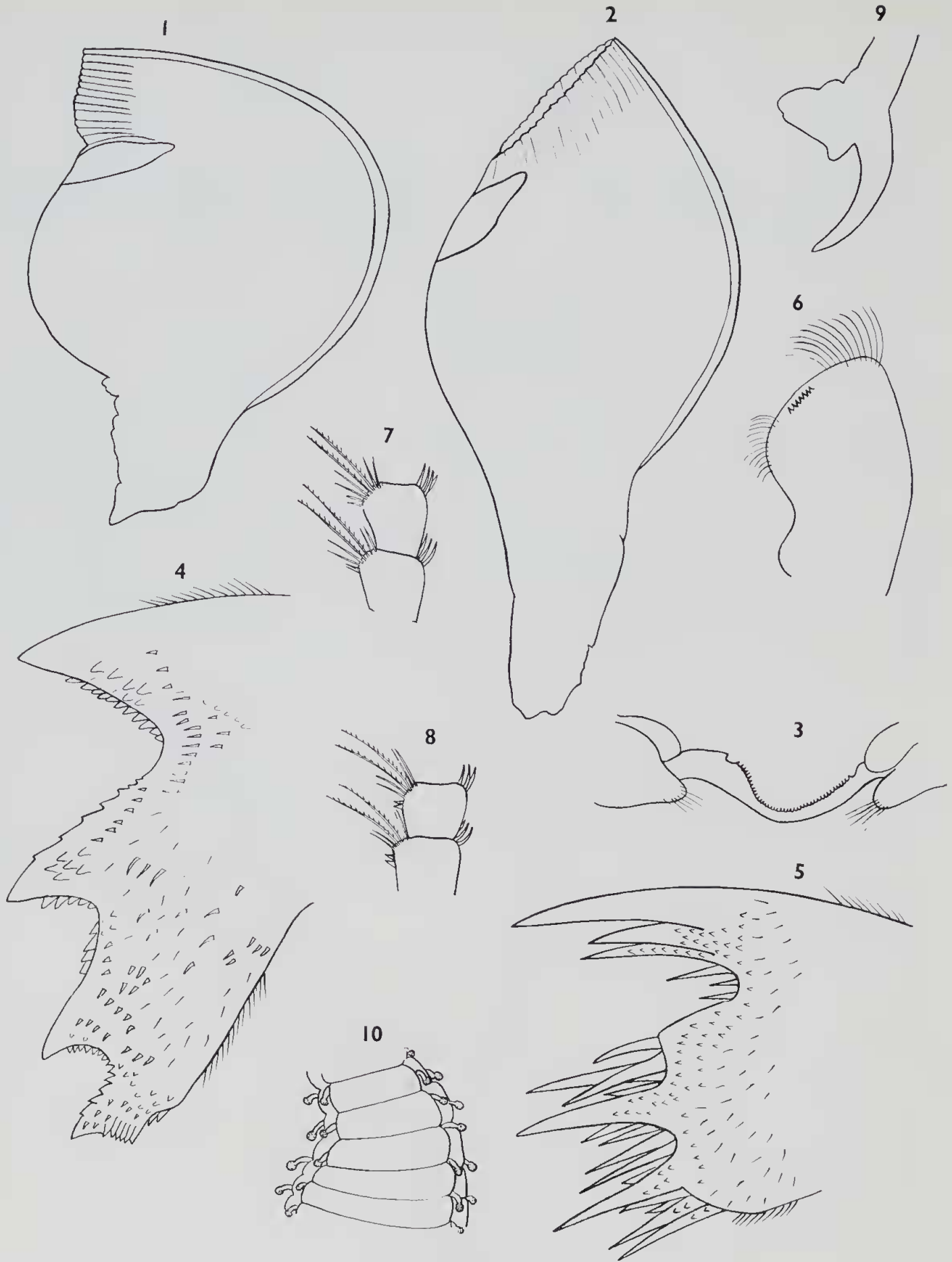
Size: The largest specimen in the collection has a capitular length of 18 mm. and a breadth of 10 mm. with the peduncle measuring 8 mm. in length and 3 mm. in breadth. The measurements of the capitulum and the peduncle in the material examined are given in the following table:—

TABLE 1

Series	Capitulum		Peduncle	
	Length in mm.	Breadth in mm.	Length in mm.	Breadth in mm.
1	18	10	8-10	3
2	12	9	10	3
3	11	8, 9	10	3
4	10	7	7	3
5	9	7	3	3
6	8	5.5-6	2-6	1.5-3
7	7	5	6	3
8	6	4-5	2-3	1.5-2
9	5	3.5-5	1.5-3.5	1.5-3
10	4	3	2-4	2-3
11	3	2	2-4	2-3

Description: The capitulum is extremely variable in shape. In some individuals it is laterally ovoid with smooth surface, and has a strongly arched carinal margin, and a moderately arched occludent margin which is interrupted by highly protuberant crenulated lips of slit-like orifice. The orifice extends to one-fourth the capitular length and the crenulations run inwards as distinct furrows (Fig. 1). In

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1, 2, 9 $\overline{1.0 \text{ mm}}$; 3, 6, 7, 8 $\overline{0.5 \text{ mm}}$; 4, 5 $\overline{100 \mu}$; 10 $\overline{200 \mu}$

Figures 1-10. *Paralepas georgei* sp. nov. 1, 2.—Entire animal, side view. 3.—Labrum with palp. 4.—Mandible. 5.—First maxilla. 6.—Second maxilla. 7.—Two segments of third cirrus. 8.—Two segments of fifth cirrus. 9.—Base of first cirrus with filamentary appendages. 10.—A few segments of penis with rivet-like structures.

some others (probably young forms) both the occludent and carinal margins are moderately arched, the former interrupted by a less protuberant orifice which extends to one-third capitular length. The lips of orifice are faintly crenulated and the crenulations slant towards base. In another series of specimens there are irregular folds on the surface with faint crenulations near the orifice. The occludent and carinal margins of the capitulum are arched equally with the occludent margin sloping into margin of orifice without interruption. The orifice is wider reaching more than one-third capitular length and capitular apex is acutely pointed (Fig. 2).

In all specimens the capitulum is greatly swollen, cuticle is strongly thickened with an inner layer of transverse muscle fibres and the orifice is slit-like, with the lips crenulated. There is a distinct carinal keel and distinct though reduced scutal plate just below the orifice.

Mouth Parts: The *labrum* (Fig. 3) is bullate with 30 to 40 sharp teeth borne on the hairless crest. The number of teeth varies according to the size of individuals, large specimens having more teeth. The palp is provided (Fig. 3) with several long and soft setae on inner margin. The *mandible* (Fig. 4) bears four teeth including the inferior angle. The lower margins of all four teeth and upper margins of 2nd, 3rd and 4th teeth are armed with several strong spines. The superior and inferior margins of the mandible bear numerous long and thin hair-like setae. Several rows of short and stout or long and thin spines occur near superior and inferior angles of the mandible. Spines also occur in groups or singly at the mid-region of the mandible. The *first maxilla* (Fig. 5) is divided by a prominent notch; the superior portion which is slightly less than one-third the total length of the free cutting edge bears an upper central strong smooth spine and two pectinated spines. The notch supports a few thin spines. Below the notch the cutting edge bears two major pectinated spines (equal in size to the smaller spines of the tridentate group above), interspersed with paired thin spines. The surface is clothed with numerous slender spinules and few teeth arranged in groups and rows. The superior and inferior margins bear numerous long spinules. The second maxilla (Fig. 6) is elongated, its superior margin supporting a group of long setae and inferior margin supporting slightly shorter setae; the space between these two groups bear 7-9 sharp teeth.

Cirri: The cirri are all short, and only slightly curled. The pedicels of all cirri are rather long. The number of segments in the rami of the cirri in the specimens examined is as follows:—

Cirrus i-9-10, 7-8; Cirrus ii-13-14, 15-16;
Cirrus iii-15-16, 15-16; Cirrus iv-15-16,
16-17; Cirrus v-14-15, 17-18; Cirrus
vi-14-16, 17-18.

The first cirrus is inserted very near the mouth and is separate from the second cirrus. The inner rami of the first cirrus is nearly half as broad again and slightly longer than the outer rami. Both rami are densely armed with whorls of slender plumose spines. The spines

of the basal segments are straight and are plumose on both sides. The spines of the distal segments are slightly curved with the greater curvature being plumose.

The cirri ii to vi are nearly equal in length. The inner rami of cirri ii and iii are slightly broader than the outer rami, while in the cirri iv to vi the rami are nearly equal in width.

Each segment of the cirri ii to vi exhibits the armature typical of the subgenus *Paralepas*. The lesser curvature of the segments support a semi-circle of long and slender spines (the longest pair of spines being plumose on one side) below articulation (Fig. 7). In cirri iv to vi, in addition to these spines, each segment bears a pair of spinules below the semicircular whorl of spines (Fig. 8). The greater curvature of the segments of cirri ii to vi supports at each articulation a semi-circle of stout, claw-like spines.

At the base of the first cirrus there is a single large filamentary appendage (Fig. 9). At the base of the sixth cirrus there is a caudal appendage; it has seven to twelve segments and is a little longer than the protopodite of the sixth cirrus. The penis is long, tapering, distinctly annulated, has minute, rivet-like structures placed along its length (Fig. 10), and also bears long setae and short spines scattered over surface and at tip.

Remarks: Newman (1960) following the suggestions of Pilsbry (1907), Annandale (1909) and Broch (1922) raised the subgenera *Heteralepas* Pilsbry and *Paralepas* Pilsbry to the generic level. The genus *Paralepas* Pilsbry is considered to include the following valid species and forms: *P. dannevigii* (Broch, 1922), *P. distincta* (Utinomi, 1949), *P. globosa* (Hiro, 1936), *P. intermedia* (Hoek, 1907), *P. lithotryae* (Hoek, 1907), *P. minuta* (Phillipi, 1836) and subspecies *americana* (Pilsbry, 1953), *P. morula* (Hoek, 1907), *P. nodulosa* (Broch, 1922), *P. palinuri* (Barnard, 1924) and subspecies *urae* (Newman, 1960), *P. pedunculata* (Hoek, 1883), *P. pericarinata* (Pilsbry, 1907), *P. reticulata* (Annandale, 1914), *P. rosea* (Hiro, 1938), *P. tuberosa* (Nilsson-Cantell, 1932), *P. xenophorae* (Annandale, 1906), and *P. scyllarusi* Utinomi, 1967.

The present species can be separated from all these species excepting *P. dannevigii* (Broch) by the presence of both scuta and a carinal keel. *P. dannevigii* (Broch) which also possesses a pronounced carinal keel and chitinous scuta occurs in deep water on gastropods and differs conspicuously in the mandible being armed with small denticles on the lower side of the third tooth only, the maxilla having a relatively lesser pronounced notch with strong spine at upper edge and the penis with a tuft of hairs at the distal end and a few rather short hairs on sides.

The present species resembles *P. palinuri urae* Newman (1960, fig. 6 G.), *P. distincta* Utinomi (1949, fig. 2 D), *P. lithotryae* Hoek (1907, pl. ix, figs. 8-8') and *P. scyllarusi* Utinomi (1967, fig. 2 d) by the possession of a broad tapering and coarsely annulated penis which is furnished with many rivet-like structures.

The present forms differ conspicuously from all the known species of *Paralepas* in the distinct pectination of the mandible *i.e.*, the lower

margins of all four teeth and upper margin of 2nd, 3rd and 4th teeth supporting several strong spines, several rows of short and stout or long and thin spines occurring near superior and inferior angles and also the occurrence of spines in groups or singly at the midregion of the mandible. The first maxilla also is distinct by the possession of an upper central smooth strong spine and two smaller pectinated spines below, with the deep notch supporting a few thin species and cutting edge below notch bearing two large spines which are pectinated and surface of maxilla clothed with numerous slender spines and few teeth arranged in groups and rows. The lesser curvature of each segment of cirri iv-vi, in addition to supporting a semicircle of long and slender spines (of which the longest pair are plumose on one side), bears a pair of spinules. This is also a peculiar feature. Hence it is treated as a new species, *Paralepas georgei*.

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